4.0 ENVIRONMENTAL CONSEQUENCES

This section provides an assessment of the potential environmental consequences associated with the No Action Alternative and the Proposed Action for the environmental resources described in Section 3.0.

4.1 NATURAL ENVIRONMENT

Potential project-related impacts to climate and air quality, geology and soils, water resources, and mitigation of impacts to earth resources are discussed in the following sections for the Proposed Action. The possible impacts associated with the No Action Alternative are also discussed in each resource section.

4.1.1 Climate and Air Quality

The No Action Alternative will have no direct, indirect or cumulative effects to climate or air quality in the regional area.

The Proposed Action will have no long-term effects the regional or local climate. The Proposed Action may cause minor, local, short-term adverse effects to air quality due to the generation of fugitive dust and emissions from construction vehicles during construction activities. The upgrade from the existing 115kV transmission line to 230kV in some segments will have no measurable effects on ozone levels. Fugitive dust and vehicle emissions will be minimized by employing the Standard Construction Practices provided in **Appendix F**.

4.1.2 Earth Resources

Potential project-related impacts to geology and soils are discussed in the following sections.

4.1.2.1 Physiography and Topography

The No Action Alternative and the Proposed Action will have no direct, indirect or cumulative effects on area physiography or topography.

4.1.2.2 Geology

The Proposed Action or No Action Alternative will have no effect on area geology. Due to the relatively low seismic risk potential for the Project Area, the potential for earthquake damage to the Proposed Action is relatively low. There are no significant geologic hazards in the Project Area. No identified mineral resource areas are crossed or impacted by the Proposed Action.

4.1.2.3 Soils

The No Action Alternative will result in minimal additional direct, indirect, or cumulative effects to soils. Construction activities associated with maintenance and repairs of the existing transmission lines, such as soil disturbance and compaction, may cause minor, short-term soil effects in localized areas. Repairs will be required with increasing frequency as the lines increase in age.

Construction activities associated with the Proposed Action, during installation of the new structures between the LaPorte Tap and the Richards Lake Tap, such as soil disturbance and compaction, may cause temporary, short-term soil erosion in this localized area. The soils in the Project Area have been previously disturbed for installation of the existing transmission lines without significant adverse effects.

Some of the soil types within the Project Area are designated as Prime Farmlands. The Proposed Action is not expected to have significant adverse effects to Prime and Important Farmlands because the proposed disturbance areas are within the existing transmission line ROWs and are previously disturbed. In the area between the LaPorte Tap and the Richards Lake Tap, new poles are to be placed in the same locations as the existing structures; therefore, no additional soils are expected to be removed. Impacts to Prime Farmlands are not expected to be significant.

The Proposed Action will have no significant impacts related to soils provided that the disturbance areas are revegetated and that soil erosion and compaction are minimized by implementing the Standard Construction Practices provided in **Appendix F**.

4.1.3 Water Resources

Potential project-related impacts to surface water, floodplains, and groundwater are discussed in the following sections.

4.1.3.1 Surface Water and Floodplains

The No Action Alternative will require maintenance and repair activities with increasing frequency as the existing lines increase in age. These construction activities may cause minor, localized, and short-term adverse effects to water quality from runoff of soils and sedimentation of waterways.

There are no anticipated adverse effects from the Proposed Action or the No Action Alternative on the occurrence or flow of any surface waters in the Project Area because water will not be diverted, detained, retained or consumed by either alternative. There are no delineated special sources of water within the Project Area. Under the Proposed Action, small amounts of water would be drawn from commercial sources for use in construction. The quantity of water used during construction of the Proposed Action will not be sufficient to affect water quantity.

Minor, localized, and short-term adverse effects to water quality may occur during the construction activities associated with the Proposed Action. Sedimentation of waterways may be caused by erosion from disturbed upland areas, and direct introduction of soil into suspension

from drilling foundation holes. Contaminants could potentially be introduced to surface water from runoff of accidental spills (i.e., fuels used for construction equipment).

Standard Construction Practices (see **Appendix F**) to minimize potential adverse impacts to water quality will be implemented. Structures will not be placed in stream beds or drainage channels. Access to the Proposed Action will be provided by existing access roads, and construction vehicles will use existing bridges for crossing rivers or culverts in dry or intermittent streams. In the area of new pole installation between the LaPorte Tap and Richards Lake Tap, disturbed areas will be protected with silt barriers to intercept sediment and reclaimed promptly to reduce the potential for erosion and the introduction of sediments to surface waters. Construction will be suspended during heavy rainfall conditions to minimize sedimentation of streams.

The transmission lines will span water resource areas, including floodplains and riparian areas. No impacts to surface water channels or stock ponds are anticipated. No adverse impacts to floodplain or riparian areas are anticipated to occur from implementation of the Proposed Action. A Floodplain/Wetlands Assessment Report is for the Proposed Project provided in **Appendix D**.

4.1.3.2 Groundwater

The Proposed Action and No Action Alternative will not affect groundwater resources. There are no delineated sole source aquifers or well head protection areas in the Project Area (Karst 2000). There are no identified wells within the existing transmission line ROWs.

4.2 BIOLOGICAL RESOURCES

Potential project-related impacts to vegetation, wetlands and riparian area, wildlife and fisheries, and threatened and endangered species, and mitigation of impacts to biological resources are discussed in the following sections. Impacts to biological resources are also addressed in the Biological Assessment (**Appendix C**).

4.2.1 Vegetation

Potential project-related impacts to terrestrial vegetation, wetlands and riparian areas, and species of concern are discussed in the following sections.

4.2.1.1 Terrestrial Vegetation

Implementation of the No Action Alternative will result in minimal or no additional direct, indirect, or cumulative effects to vegetation. Maintenance and repair activities may cause minor, short-term adverse effects to vegetation. Repairs will be required with increasing frequency as the lines increase in age.

Impacts to vegetation associated with the Proposed Action would be confined to the immediate area of the pull-sites, existing access roads, new access roads, pole replacement sites, and equipment staging areas within the ROWs of the existing transmission lines. Potential adverse effects include the compaction of soils, loss of native vegetation, and an increase in the potential

for invasions of noxious weeds, especially where poles are replaced. Short-term effects at pull-sites would be kept to the minimum amount necessary for construction. There may be some clearing of woody vegetation between pull-sites in those portions of the ROW that are in riparian (stream-side) areas to facilitate lifting conductor wires into place. New access roads may be constructed between the LaPorte Tap and the Poudre Substation and would effects native vegetation in the long-term.

Short-term effects to vegetation would occur with the loss of cover and biomass as vegetation is disturbed at pull-sites and equipment staging areas. These effects would be primarily short-term, as vegetation would replenish itself either from natural recruitment or reclamation seeding. Soil disturbance that may occur due to the replacement of poles would be reclaimed. New access roads would also disturb soil and these areas will be reclaimed as needed and where possible.

Direct effects to vegetation will occur due to removal of vegetative cover during the installation of new structures in approximately six miles of the ROW area between the LaPorte Tap and Richards Lake Tap. The disturbance areas for the Proposed Action will be within the previously disturbed areas of the existing transmission line ROWs. Few (if any) new access roads will be constructed as part of the Proposed Action.

Soil compaction will occur within the existing transmission line ROWs during the project-related construction activities, such as vehicle movements and structure assembly and erection within the existing ROW between the LaPorte Tap and the Richards Lake Tap. Effects to soils resulting from compaction will not be perceptibly different from those resulting from installation of the existing transmission line. Some soil compaction will occur within the existing ROW for the No Action Alternative due to ongoing maintenance activities.

Potential opportunities for invasion of weedy plants, and displacement of native plants, may occur due to soil disturbances in the existing ROW between the LaPorte Tap and the Richards Lake Tap during project-related construction activities for installation of the new poles. Establishment of weedy species will be minimized by the use of the Larimer County recommended practices for weed control along with the Standard Construction Practices outlined in **Appendix F**.

Ground disturbance that may occur in the existing ROW due to the installation of new poles will be reclaimed. If possible, native seed mixes and plant species, as recommended by the City of Fort Collins Natural Resources Department, will be used. Revegetation will comply with noxious weed regulations listed in Chapter 20, Article III of the Fort Collins City Code (CFC 2000a). Periodic monitoring of revegetated areas will take place to detect any infestations of species on the Larimer County noxious weed list (Larimer County Weed Control District 1997). If noxious weeds become established, methods of weed control may be utilized. Weed control methods may include mechanical, biological, or chemical methods. Effects associated with the invasion of weedy species as a result of implementation of the Proposed Action or No Action Alternative will be minimal.

4.2.1.2 Wetlands and Riparian Areas

The No Action Alternative will have no potential to cause effects to wetlands.

No effects will occur to wetlands or riparian areas as a result of the Proposed Action. Under the Proposed Action, none of the pull-sites, equipment staging areas, new access roads, or pole replacement sites will be located in wetlands or riparian areas. All wetlands and riparian areas occurring within the Project Area will be avoided by accessing structure locations between pull-sites by alternate routes. Use of a helicopter between the Rawhide Energy Station and the LaPorte Tap is being considered. Because the Proposed Action will be located within the existing transmission line ROW, the need to clear vegetation will not exist, with the possible exception of where the transmission line crosses the Cache la Poudre River, especially the City of Fort Collins Natural Areas. There may be a need to clear some tree branches or shrubs in order to pull the conductors into position. In the Springer Natural Area, all individuals of the American black currant shrubs will be marked and avoided and all appropriate City of Fort Collins permits for vegetation removal will be secured (CFC 2000a). Project managers will coordinate with City of Fort Collins officials regarding the Locust Stormwater Outfall Project to avoid impacts to wetland creation efforts.

4.2.1.3 Species of Concern

The two federally-protected plant species that occur in the Project Area are Ute-ladies'-tresses orchid and Colorado butterfly plant as discussed in the following sections. In addition, three rare plants that are of concern within the Project Area are Bell's twinpod, showy prairie gentian, and American black currant. The No Action Alternative will not cause effects to these species.

Ute Ladies'-Tresses Orchid

Implementation of the Proposed Action or No Action Alternative will have no effect on this species or its habitat. This determination is based on a lack of known occurrences for this species in the Project Area.

Colorado Butterfly Plant

Implementation of the Proposed Action or No Action Alternative will have no effect on this species or its habitat. This determination is based on a lack of known occurrences for this species in the Project Area.

Rare Plants

The Proposed Action will have no effects on Sensitive Species, including rare plants, wetlands and riparian areas within the Project Area because no ground disturbances are planned within the habitat areas for these species. Known location of occurrences of rare plants will be marked and avoided.

4.2.2 Wildlife and Fisheries

Potential project-related effects to terrestrial wildlife, fisheries, and threatened, endangered, and candidate species are discussed in the following sections.

4.2.2.1 Terrestrial Wildlife

The existing transmission lines associated with the No Action Alternative were designed to meet or exceed the design recommendations to minimize electrocutions of raptor species (APLIC 1996). The No Action Alternative is unlikely to effect avian species.

Maintenance and repair activities associated with the No Action Alternative may have short-term effects on wildlife in the vicinity of the existing ROWs. Emergency repair activities may need to occur during critical time periods and in important locations for wintering mule deer, antelope concentration areas, or nesting and wintering raptors. Outage records for the Rawhide Energy Station to LaPorte Tap segment of the existing transmission line indicate that emergency repair work that requires crews to go into the field to repair the line occurs about once every eight to ten years. Over time, repairs will be required with increasing frequency as the transmission lines increase in age.

Conditions analyzed for potential effects to wildlife and fisheries included noise, increased access, avian collisions, avian electrocutions, wildlife movement, stream siltation, and habitat loss. In general, effects to wildlife resources are expected to be minimal. Wildlife species in and near the ROW may be displaced temporarily during project-related construction activities. Vehicle use of the ROWs would increase only during the construction activities related to the Proposed Action. The potential for related effects to avian species might increase slightly. Wildlife movement may be temporarily affected during construction activities associated with the Proposed Action. Stream siltation would not be an effect during project activities if Standard Construction Practices are implemented (**Appendix F**). Wildlife habitats would not be substantially altered, lost, or fragmented except where new access roads may be constructed from the LaPorte Tap to the Poudre Substation.

Noise from construction activities associated with the Proposed Action may have short-term effects on wildlife. Activities associated with the project may displace wildlife from the immediate area of the ROW. The overall effects of project-related construction activities and maintenance are expected to be short-term. Due to the large extent of the wildlife habitats adjacent to the ROW, and because of the short time span over which project-related construction activities at any given location would occur, wildlife would be able to seek refuge and adequate habitat in nearby locations.

Emergency maintenance activities related to the Proposed Action could result in temporary disturbance of wildlife species. Some of this disturbance could occur during critical time periods and in important locations for wintering mule deer, antelope concentration areas, or nesting and wintering raptors. Due to the anticipated reliability of the new lines, emergency maintenance activities are expected to be rare. The need to perform emergency repair work for the new lines is likely to be rare.

The Proposed Action would increase vehicle traffic temporarily on access roads during construction activities. Vehicle traffic would increase only during project-related construction activities on existing access roads. Again, due to the short time span over which project-related construction activities would occur at any given location and given the conclusion that adequate habitats are available to species adjacent to the ROW, disturbance to wildlife would be minimal. In the long-term, the amount of private land along the existing ROW (more than 90 percent private) is substantial and would deter indiscriminate access on existing roads. New access roads would also have the potential to increase access along the Cache la Poudre River. However, gates and other structures, such as dirt berms, can reduce the likelihood of indiscriminant access that may affect wildlife. Therefore, the amount of vehicle traffic should not increase from existing conditions, except during project-related construction activities and in areas where new access roads (if any) are left ungated.

The transmission lines associated with the No Action Alternative have been in place for more than 18 years and collisions have not been a problem (Dahl 2001). No data indicate that the existing lines have caused either collision or electrocution of birds in the Project Area.

The Proposed Action is not likely to adversely effect Golden eagles or other raptor species that may occur in or near the Project Area. The Proposed Action would not change the potential for avian collisions compared with the existing transmission line. Use of a slightly larger static wire actually may reduce the potential for birds to collide with this line due to its greater visibility.

The Proposed Action involves only high voltage (115/230kV) transmission lines. High voltage lines do not generally represent a major electrocution hazard to birds (APLIC 1996). In fact, most electrocutions occur on lower voltage distribution lines. The conductors for high voltage lines are further apart than the wingspan of even the largest raptor. The line configuration for the Proposed Action meets and exceeds design recommendations minimizing electrocutions for all raptor species. Consequently, the Proposed Action would not change the potential for avian electrocution compared to the existing transmission line which is minimal (Dahl 2001).

Installation of a second transmission line on existing structures or replacing poles within an existing ROW would not hamper long-term wildlife movements because no barrier to movement would be established. Furthermore, the structure and appearance of the existing line would not be changed. Wildlife movement patterns would not, therefore, be changed by the Proposed Action from the existing situation. Project-related construction activities for the Proposed Action may temporarily disrupt migrating wildlife or cause slight alteration in migration paths. However, this disruption would be very short-term due to the short period of time that project-related construction activities would occur at any given location.

No siltation is expected to result from construction activities for the Proposed Action, because pull-sites, equipment staging areas and pole replacement sites are not located in wetlands. Where pole replacement sites are near stream or river crossings or where new access roads would be built (i.e., within 20 feet of water course or ditch leading to water course), silt fencing would be used between the site and the water course. The silt fencing would be kept in place until revegetation efforts have taken place. Theses efforts would ensure that stream siltation is minimal if not non-existent.

Permanent loss of existing wildlife habitat would occur only in areas where new access roads would be built. No other permanent losses would occur as a result of this project. Minimal short-term disturbance of vegetation would occur at pull-sites and equipment staging areas, but these areas are expected to naturally revegetate over a short-term. Pole replacement sites and the locations of new access roads would experience more impact than other portions of the Project Area. These areas would be reseeded, when possible, according to the standards of Larimer County and the City of Fort Collins. Revegetation within the City of Fort Collins would comply with noxious weed regulations listed in Chapter 20, Article III of the Fort Collins City Code (CFC 2000). Existing roads will primarily be used for access to the ROWs.

4.2.2.2 Fisheries

The No Action Alternative will have no direct, indirect or cumulative effects on fisheries.

Effects to fisheries as a result of the Proposed Action will be minimal based on the fact that any areas supporting fisheries will be spanned by the transmission lines. There is no potential for direct effects to fish habitat or populations. Implementation of the Standard Construction Practices (**Appendix F**) will eliminate the potential for indirect impacts to fish habitats or populations. No stream siltation is expected to result from the construction or maintenance activities for the Proposed Action.

4.2.2.3 Threatened, Endangered, and Candidate Species

Effects to federally listed, proposed, and candidate species of plants and animals would be similar to those described for vegetation, wetlands, and terrestrial wildlife. Specific potential effects to listed species that occur within the Project Area are presented in summary in **Table 4-1** and in detail in the Biological Assessment (**Appendix C**). The existing transmission lines associated with the No Action Alternative have been in place for many years with minimal effects to raptors, including bald eagles (Dahl 2001). Emergency maintenance or repair activities for the existing lines could result in temporary disturbance to these species.

A "no effect" determination was reached for the Proposed Action for four of the eight species analyzed in the Biological Assessment. A determination of "may affect, not likely to adversely affect" was reached for the Proposed Action for the bald eagle, mountain plover, and Preble's meadow jumping mouse. On September 12, 2001, the U.S. Fish and Wildlife Service concurred with Western's determinations (**Attachment 1**, Correspondence) The Proposed Action involves only high voltage (115kV/230kV) transmission lines. High voltage lines do not generally represent a major electrocution hazard to birds (APLIC 1996). In fact, most electrocutions occur on lower voltage distribution lines.

4.3 HUMAN ENVIRONMENT

The No Action Alternative will require some ongoing maintenance and repair activities with associated indirect effects to the human environment resulting from short-term disturbances to residential land uses from noise, dust, and sights of maintenance equipment. These repairs will increase in frequency as the existing transmission lines increase in age.

Effects to the human environment may occur from the construction, maintenance, and operation of the Proposed Action. Construction activities related to the Proposed Action are expected to occur over a 12-month period and will generally follow a sequential set of activities performed by crew proceeding along the length of the line. Potential project-related effects to land ownership, land use, visual resources, socioeconomics, public health and safety, and electrical effects are discussed in the following sections.

TABLE 4-1
Endangered, Threatened, Proposed and Candidate Plant and Wildlife Species Addressed in the Biological Assessment[1]

Common Name (*Scientific Name*)	Federal Status[2]	General Habitat	Determination
Bald Eagle (*Haliaeetus leucocephalus*)	T	Riparian areas, rivers and lakes	May affect, but not adversely affect
Mountain Plover (*Charadrius montanus*)	PT	Short-grass prairie	May affect, but not adversely affect
Black-tailed prairie dog (*Cynomys ludovicianus*)	C	Short- or mid-grass prairie	No effect
Preble's meadow jumping mouse (*Zapus hudsonius preblei*)	T	Woody riparian areas with thick herbaceous cover and water	May affect, but not adversely affect
Black-footed ferret (*Mustela nigripes*)	E	Associated with large prairie dog colonies	No effect
Ute ladies'-tresses orchid (*Spiranthes diluvialis*)	T	Subirrigated, alluvial soils along streams & in floodplain meadow	No effect
Colorado Butterfly Plant (*Guara neomexicana* ssp. *coloradensis*)	T	Subirrigated, alluvial soils in mixed grass prairie	No effect

Footnotes:
1. Sources: Carlson 2000; CDOW 2000a, c; CNHP 2000; USFWS 2000a
2. Abbreviations: E=endangered, T=threatened, PT=proposed threatened, C=candidate

4.3.1 Land Ownership

The No Action Alternative will result in no additional direct, indirect, or cumulative effects to land ownership.

Western owns the existing easements and land rights for the ROWs where the proposed new poles will be constructed between the LaPorte Tap and Richards Lake Tap. Platte River owns the existing easements and land rights for the ROWs where the second circuit will be strung on existing poles. Current land uses in and adjacent to the ROWs are compatible with the existing transmission lines.

Because the Proposed Action will be located within the existing transmission line ROWs, there will be no associated land ownership changes, and no additional land rights will be required. The ROWs will not be widened for the Proposed Action.

4.3.2 Zoning

The existing transmission lines and ROWs associated with the No Action Alternative are compatible with the zoning ordinances of Larimer County and the City of Fort Collins.

No rezoning will be required as part of the Proposed Action because the new lines will be located within the ROWs of the existing transmission lines. The Proposed Action will result in no additional direct, indirect, or cumulative effects to zoning.

4.3.3 Land Use

Because the existing transmission lines and ROWs are currently in place, the No Action Alternative will result in no additional direct, indirect, or cumulative effects on land use. However, effects resulting from the existing transmission lines will continue to affect land use in the Project Area.

There will be no long-term changes to the existing land uses as a result of implementation of the Proposed Action. The Proposed Action will result in short-term effects to land use primarily as a result of construction and reclamation activities. The Proposed Action includes the stringing of new line on existing poles between the LaPorte Tap and the Rawhide Energy Station and the construction of new single-column steel poles within a six-mile segment of the existing transmission line ROW between the LaPorte Tap and the Richards Lake Tap, replacing the H-frame wood poles.

Potential effects to current land uses related to the Proposed Action may be direct or indirect. Examples of direct effects to current land uses include traffic delays due to short-term obstruction of traffic at road crossings, and the intrusion of construction equipment and crews into the area. Possible indirect effects are the short-term generation of dust, noise and sights created by project-related construction activities.

Maintenance activities over the life of either the No Action Alternative or the Proposed Action will continue to require crews and equipment to periodically enter the area, using the ROW and public roads for access. Implementation of the Proposed Action will not pose additional effects due to maintenance activities compared to those of the No Action Alternative.

Because disturbances associated with implementation of the Proposed Action will occur within the existing transmission line ROWs, effects to land uses are greatly reduced. Generally, access to each structure location will be from existing roads. Cross-county travel along the existing transmission line ROWs may be required in several areas. Few (if any) new access roads will be constructed as part of the Proposed Action. Areas disturbed during project-related construction activities will be restored, as nearly as feasible, to their original condition.

4.3.3.1 Agriculture/Rangeland

As the existing transmission lines and ROWs are in place, the No Action Alternative will not effect existing agricultural/rangeland uses. Rangeland and transmission line corridors are generally compatible land uses.

The Proposed Action will have no long-term adverse effects to cropland because disturbance activities will occur within the ROWs of the existing transmission lines. Because the new poles are to be in the same locations as the existing poles, no new disturbances will be required in cropland areas.

4.3.3.2 Residential

The existing transmission lines and ROWs associated with the No Action Alternative have been located in the Project Area since approximately 1952 for the area between the LaPorte Tap and the Richards Lake Tap. The existing transmission line between the LaPorte Tap and the Rawhide Energy Station was built in 1983. The existing line between the Poudre Substation and the Timberline Substation was put in service in 1984. The No Action Alternative will have no additional direct, indirect or cumulative effects on residential land uses.

Long-term effects resulting from implementation and maintenance of the Proposed Action are not anticipated to be additional to those associated with the existing transmission lines. Potential temporary, short-term effects to residential land uses during construction activities for the Proposed Action will be increases in noise, dust, traffic and the intrusion of equipment and construction crews onto private property during construction activities.

4.3.3.3 Public Land/Designated Open Space

The No Action Alternative will have no effects to land use of public lands or designated open space areas in Larimer County or within the City of Fort Collins.

There are no proposed disturbances within Larimer County public lands or designated open space areas as part of the Proposed Action. Implementation of the Proposed Action will result in minimal, short-term, temporary land use effects within the City of Fort Collins public open lands, river conservation or natural areas.

The Proposed Action includes pole relocation for one pole within the existing transmission line ROW that traverses the McMurry Natural Area. The existing transmission line crosses a pond within this area and an existing pole is currently located in the middle of a small peninsula in the middle of a pond. The land use effects as a result of the proposed pole relocations will be positive because the relocated pole will have reduced land use impacts compared to the existing poles.

Short-term, temporary adverse land use effects associated with the proposed construction activities within the McMurry Natural Area include compaction of soils, loss of native vegetation, and a potential for an increase in invasions of noxious weeds as discussed in Section **4.2.1.1, Terrestrial Vegetation**. Following construction, reclamation activities will include

revegetation of the disturbed areas with native seed mixes and/or plant species, and weed control methods as recommended by the City of Fort Collins, Natural Resources Department.

Within the City of Fort Collins Natural Areas located in the vicinity of the ROW of the existing transmission line between the Poudre and Timberline Substations, the Proposed Action involves only stringing new conductors on the existing lines. Because the Proposed Action is located within the existing transmission line ROW, the need to clear vegetation will be minimal. No new poles need to be constructed in these areas, and there will be minimal or no ground disturbances. There may be a need to clear some tree branches or shrubs in order to string the second circuit on the existing double-circuit line within the ROW. Short-term, temporary adverse land use effects associated with the proposed construction activities within the existing ROW include compaction of soils, loss of native vegetation, and a potential for an increase in invasions of noxious weeds as discussed in Section **4.2.1.1, Terrestrial Vegetation**.

No effects will occur to wetlands or riparian areas as a result of the Proposed Action as discussed the Floodplain/Wetlands Assessment Report **(Appendix D),** and in **Section 4.2.1.2, Wetlands and Riparian Areas**.

All appropriate City of Fort Collins permits for vegetation removal will be secured (CFC 2000a). During construction activities in the Springer Natural Area, all individuals of the American black current shrubs would be marked and avoided. The Proposed Action will have no adverse effects on terrestrial wildlife, avian species, fisheries, or plant species of concern within the City of Fort Collins Natural Areas as discussed in the Biological Assessment (**Appendix C**), and **Section 4.2, Biological Resources**.

4.3.3.4 Infrastructure and ROWs

No effects to airport influence areas, utility ROWs, or roadways are anticipated to result from implementation of the Proposed Action or No Action Alternative. Temporary, short-term effects to roadways are anticipated to occur from construction related activities associated with the Proposed Action. The construction of the Proposed Action would create relatively minor traffic delays due to short-term lane closures.

4.3.4 Visual Resources

The No Action Alternative will result in no additional direct, indirect or cumulative effects on visual resources. However, effects resulting from the existing H-frame wood poles and transmission lines will continue to impact visual resources in the Project Area. The footprint area (ground disturbance area) for H-frame wood poles is larger than for the single-column steel poles associated with the Proposed Action.

Effects to the visual resources from the construction and operation of the Proposed Action are not expected to be significantly different from those associated with the existing transmission lines. The Proposed Action upgrades and rebuilds will have greater average height lines and poles than the existing transmission lines (see **Table 2-1**). Portions of the existing transmission lines are visible in the foreground and middleground view from residential areas and roadways. Visual effects associated with the Proposed Project were analyzed through the use of computer-generated photographic simulations as shown in **Appendix G.** Visual Resources are not

anticipated to pose significant additional effects compared to the existing transmission lines and ROWs.

Temporary, short-term effects will result from the construction of the Proposed Action. During construction, visual effects will occur due to the removal of the vegetation cover and loss of vegetation during the installation of the new poles in the existing ROW between the LaPorte Tap and the Richards Lake Tap. The new poles are to be placed in the same locations as the existing structures. The existing ROWs will not be cleared of vegetation except in the areas immediately adjacent to the pole locations.

Additional temporary, short-term effects will occur as a result of construction activities related to the Proposed Action, such as increased traffic and transport of materials on local roads, and the presence of large construction equipment and other materials in the existing ROWs.

Permanent, long-term effects to visual resources include the replacement of H-frame wood poles with single-column steel poles in the existing ROW for approximately six (6) miles between the LaPorte Tap and the Richards Lake Tap, or adding three wires to existing structures in the remaining ROWs. Because the Proposed Action will be located within the existing transmission line ROWs, long-term effects to visual resources are greatly reduced, and are not anticipated to be significantly different from those associated with the existing transmission line.

Because the Proposed Action will be located within existing transmission line ROWs, there are no Open Lands or Critical Preservation Candidate Lands designated by Larimer County within the proposed disturbance areas.

4.3.5 Socioeconomics

The Proposed Action will not cause significant effects to the socioeconomic resources of Larimer County. No permanent increase in population or workforce, employment or income, housing, or community service demands will be required for the Proposed Action. Minimal additional tax revenues would be generated by the Proposed Action.

4.3.5.1 Population

The existing transmission lines and ROWs have been established in the Fort Collins area for over 17 years. The No Action Alternative will result in no additional direct, indirect or cumulative effects to the population in the Project Area.

The Proposed Action may result in a small, short-term increase in population in Larimer County from the employment of contract construction workers from outside the county. This construction force represents an insignificant increase.

The Proposed Action is located within existing transmission line ROWs, and will not disproportionately affect minority or low-income populations.

4.3.5.2 Employment and Income

The No Action Alternative will result in no direct effects to the economy of the Project Area. Over time, the No Action Alternative may cause adverse indirect effects in the event of unreliable electric service delivery and the associated adverse effects to local businesses and industry.

Minimal, short-term positive effects to the economy of the Project Area may occur due to an increased consumer base as a result of the employment of contract construction workers from outside the county. Expenditures during project-related construction activities for equipment, energy, fuel, operating supplies, worker lodging and meals, and other consumer goods, products and services will benefit local businesses and result in short-term positive economic impacts in Larimer County.

Indirect, long-term beneficial economic effects will occur due to the Proposed Action by providing a reliable source of power for the area. The increased capability to supply energy to commercial and industrial users may contribute to economic growth and additional tax revenues in the Larimer County.

4.3.5.3 Housing

The No Action Alternative will result in no additional direct, indirect or cumulative effects to housing in the Project Area.

Most of the temporary workers for construction of the Proposed Action are expected to be housed in local motels or hotels. The demand for additional temporary housing in Larimer County is not anticipated to be significant. No significant effects to housing availability and services are expected from the Proposed Action.

4.3.5.4 Community Services

The No Action Alternative will result in no direct, indirect, or cumulative effects to community services.

The Proposed Action will have no direct, indirect or cumulative effects to community services in the Project Area. Construction, operation, and maintenance of the Proposed Action should not increase or decrease the need for police, fire, medical, or other community resources in the Project Area.

4.3.6 Public Health and Safety, and Electrical Effects

Potential electrical effects from transmission lines include fire hazards, generation of electrical and magnetic fields, safety concerns, and corona effects. The electrical effects associated with the Proposed Action and No Action Alternative are discussed in the following sections.

Adverse health effects caused by EMFs from transmission lines have not been proven by scientific studies (see **Appendix E**). Magnetic and electric field strength decreases rapidly with distance from the ROW.

The No Action Alternative will result in no additional direct, indirect, or cumulative EMF effects in the Project Area. The existing transmission lines in the Fort Collins area have been in place at least 17 years. The ROWs for the existing transmission lines were previously located to maximize the distance from residences to minimize potential EMF impacts. The distance between the existing transmission lines and residences within the Project Area is a minimum of 200 feet. At a distance of 200 feet from the transmission lines, residences are not expected to experience electric or magnetic fields greater than those produced by the some common household appliances (see **Tables 3-4** and **4-2**).

The normal load EMF data presented in **Table 4-2** for the year 2001 is the load expected for the summer 2001 service demand during normal operation of the existing transmission lines or No Action Alternative. The high load EMF values for 2001 were estimated based on the potential scenario of an outage in the existing system in the Fort Collins area, with the corresponding increase in load for the remaining segments in service.

The normal load EMF data for 2008 was estimated by assuming that the proposed rebuilds and upgrades as described for the Proposed Action are in place, and that the Rawhide Energy Station is operating with additional power generation. The high load EMF values for 2008 were also estimated base on the potential scenario of an outage somewhere within Platte River's Fort Collins area transmission system, with the corresponding increase in load for the remaining segments in service.

Because the Proposed Action is to be located within the ROWs of the existing transmission lines, the associated electric and magnetic fields are not anticipated to cause adverse health or biological effects.

4.3.6.1 Fire Hazards

Because of ongoing routine maintenance procedures as appropriate, and the scarcity of trees or branches in the existing ROW, the risk of fire generation from the No Action Alternative is minimal.

The Proposed Action will have comparable routine maintenance procedures and the risk of fire generation will also be minimal. Control of brush and weeds in the ROW and prohibiting the storage of flammables or other activities that have the potential to provide fuel for fires in the ROW should minimize the potential fire hazards.

4.3.6.2 Electrical Hazards

Safety hazards and the electrical fields associated with the No Action Alternative and the Proposed Action are discussed in the following sections.

TABLE 4-2
EMFs of the Project Transmission Lines

Year	Line Segment	Case	ROW (feet)	Load (MVA)	Electric Field (edge of ROW) (kV/m	Magnetic Field (edge of ROW) (mG)
2001	Rawhide-LaPorte 230 kV Single-circuit	Normal Load	75	104	0.5	21
2001	Rawhide-LaPorte 230 kV Single-circuit	High Load	75	125	0.6	29
2008	Rawhide-LaPorte 230 kV Double-circuit	Normal Load	75	151/118	0.9	14
2008	Rawhide-LaPorte 230 kV Double-circuit	High Load	75	220/154	0.9	20
2001	LaPorte-LaPorte Tap 115/115 kV	Normal Load	60	34/35	0.6	13
2001	LaPorte-LaPorte Tap 115/115 kV	High Load	60	64/58	0.6	24
2008	LaPorte-LaPorte Tap 115/230 kV	Normal Load	60	151/91	1.3	35
2008	LaPorte-LaPorte Tap 115/230 kV	High Load	60	220/125	1.3	47
2001	LaPorte Tap-Poudre 115 kV Single-circuit	Normal Load	75	35	0.75	15
2001	LaPorte Tap-Poudre 115 kV Single-circuit	High Load	75	58	0.7	23
2008	LaPorte Tap-Poudre 115/230 kV	Normal Load	75	44/151	0.7	24
2008	LaPorte Tap-Poudre 115/230 kV	High Load	75	82/220	0.6	30
2001	Poudre-Timberline 115 kV Single-circuit	Normal Load	60	45	0.65	24
2001	Poudre-Timberline 115 kV Single-circuit	High Load	60	67	0.65	39
2008	Poudre-Timberline 115/230 kV	Normal Load	60	42/151	1.3	32
2008	Poudre-Timberline 115/230 kV	High Load	60	80/220	1.3	42
2001	Poudre-Richards Lake 115 kV Single-circuit	Normal Load	75	25	0.75	11
2001	Poudre-Richards Lake 115 kV Single-circuit	High Load	75	60	0.75	24
2008	Poudre-Richards Lake 115 kV Double-circuit	Normal Load	75	20/20	0.25	4
2008	Poudre-Richards Lake 115 kV Double-circuit	High Load	75	60/60	0.25	13

Notes: Source: Platte River 2001
1. Single-circuit 230kV on double-circuit steel poles
2. Single-circuit 115kV on double-circuit steel poles.

Safety Hazards

The No Action Alternative was constructed to meet the applicable National Electrical Safety Code (NESC). The Proposed Action will also meet or exceed all applicable requirements of the NESC. Nevertheless, electrical equipment of any kind can be a safety hazard and special care must be taken when working or playing near transmission lines to avoid hazardous situations. Work with conducting materials near the transmission lines (i.e., metal irrigation pipe) poses a threat of a lethal electrical shock.

Direct electrical contact with the conductors is a potential hazard associated with a transmission line. Because arcing can occur across an air gap, physical contact with the high voltage conductors is not necessary for electrical contact to be made. Extreme caution is required for the

operation of tall equipment, such as drilling rigs or cranes, near the line. Water contacting the energized conductors can provide a direct path to the ground for leakage current or a flashover.

Irrigation pipe should be carried as low to the ground as possible and preferably loaded at a distance from the transmission line to eliminate spark discharge nuisance shocks. The primary hazard associated with irrigation pipe is the potential for direct contact with the conductors.

Electrical Fields

The existing transmission lines associated with the No Action Alternative have been in place for many years with no documented adverse effects from the electric fields. There have been no identified adverse biological effects or deleterious effects to human health associated with exposures to the electrical fields generated by 230kV transmission lines. Over most of the ROW, the electric field will be below perception level for humans. The electrical field of the Proposed Action is not anticipated to cause adverse biological or human health effects.

4.3.6.3 Magnetic Fields

The existing transmission lines associated with the No Action Alternative have been in place for many years with no documented adverse effects from magnetic fields.

There is no conclusive evidence of human health hazards resulting from exposure to magnetic fields from transmission lines. There is no consistent or conclusive evidence to date to indicate a health hazard to humans form being exposed to residential electric and magnetic fields from transmission lines or appliances (**Appendix E**). The epidemiological evidence from both residential and occupational studies for an association between electrical and magnetic fields and cancer or the adverse effects in humans is inconclusive and does not indicate a causal link. The magnetic fields associated with the No Action Alternative have not been linked to any biological or human health effects. The magnetic fields associated with the Proposed Action are not anticipated to cause adverse biological or human health effects.

Alternating magnetic fields induce voltages at the open ends of conducting loops. Objects such as fences, irrigation pipes, pipelines, electrical distribution lines, and/or telephone lines can form the conducting loop. The earth to which the conductor is grounded forms the other portion of the loop. Standard construction measures that are used for electric field induction, such as grounding and breaking electrical continuity, also reduce magnetic field induction effects.

Based on grounding practices and the standard construction measures for the Proposed Action, magnetically induced voltages and currents are minimized to the extent that they are unlikely to have adverse impacts. Double-circuit lines with taller poles allow for more balanced loading which reduces the magnetic field levels compared to single-circuit lines of the same amount of power.

4.3.6.4 Corona Effects

Corona effects are caused by the electrical breakdown of air into charged particles created by the electrical field at the surface of the conductors, and include audible noise, generation of ozone, and radio and television interference. Corona effects are generally only associated with

transmission lines operating at higher altitudes or at voltages of 345kV or above. Corona effects associated with the existing lines of the No Action Alternative have not caused any documented adverse effects. The Proposed Action is also not anticipated to have significant corona effects.

Audible noise may be present during inclement weather, but is not anticipated to be an annoyance during most weather conditions. Noise from corona effects will be masked by naturally occurring sounds at locations beyond the ROW, such as rainfall and wind. There is no indication that the existing transmission lines associated with No Action Alternative have generated noise at annoyance levels. The noise generated by the Proposed Action will not be perceptibly different from the noise generated by existing transmission lines.

There is no indication that existing transmission lines associated with the No Action Alternative have caused radio or television interference. Radio and television interference associated with the Proposed Action is not expected to be noticeable and will not be perceptibly different from the existing transmission line.

No ozone generation effects have been observed for the No Action Alternative. The upgrade from the existing115kV transmission lines to 230kV lines in the areas of the ROW between the LaPorte Tap and the Rawhide Energy Station will have no measurable effects on ozone levels. Ozone generation from the Proposed Action would be undetectable.

4.4 CULTURAL RESOURCES

The No Action Alternative will result in little or no additional direct, indirect, or cumulative effects to cultural resources in the Project Area. Routine maintenance and repair activities requiring ground disturbances could result in effects to unidentified cultural resources within the ROWs of the existing lines.

This section describes the potential effects to cultural resources resulting from the Proposed Action. Effects include direct effects to sites resulting from construction or vehicular activity; indirect effects resulting from use or vandalism; and aesthetic effects to sites from encroachment of the line on visual sightlines.

At least six significant cultural resources have been recorded within 500 feet of the centerline of the existing line. These include the Coy/Hoffman Barn, the Rex Branch of the Burlington Northern Railroad, Lake Canal Ditch, Poudre Valley Canal, and two prehistoric aboriginal stone circles. In addition, 10 potentially significant resources are on record but need further evaluation

before this determination can be made. Potential significant resources noted consist of historic canals and ditches, and prehistoric aboriginal camps with stone circles.

Because the historic LaPorte Tap to Poudre Substation and Poudre Substation to Richards Lake Tap segments are not considered significant or eligible for the National Register, the effects of replacing the H-frame wood poles and upgrading the line for the Proposed Action are not considered significant impacts.

Previous reports indicate a low to medium probability of cultural resources within the area of potential effect (approximately one site per mile of line). Based on information available from files searches and recent investigations in the area, fewer than five significant prehistoric or historic cultural resources have the potential to be impacted by the rebuild of the existing line. Avoidance of the properties during construction of the Proposed Action is possible and should prevent direct impacts. Indirect impacts can be minimized by requiring that all activities take place within the right-of-way.

Western Area Power Administration notified official representatives of the appropriate American Indian tribes (Northern Arapahoe, Shoshone, Northern Cheyenne River Sioux, Rosebud Sioux, Pine Ridge Sioux, Devils Lake Sioux, Standing Rock Sioux, Turtle Mountain Chippewa, and Three Affiliated Tribes) of the Project Area and asked them to provide input on any traditional cultural properties or areas of concern that might be affected (see **Attachment 1**). No known traditional cultural properties are on record.

In the event of the discovery of unanticipated cultural material or unmarked human remains, the construction contractor will be required to cease work in the immediate vicinity of the find and take appropriate measures to protect the remains from further intentional or inadvertent disturbance. A qualified archaeologist will be contacted to assess the remains, and the State Historic Preservation Officer will be notified within 24 hours of the discovery and preliminary assessment.